[WDNR] Wisconsin Department of Natural Resources. 2004. Oak and Pine Barrens Communities. Ecological Landscapes of Wisconsin - Ecosystem Management Planning Handbook, HB1805.1.

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OAK AND PINE BARRENS COMMUNITIES

Community Description

The barrens plant community occurs on infertile droughty soils and is dominated by grasses, forbs, low shrubs, and scattered trees. One consistent element of all barrens is that they depend on fire.

Historically, the most extensive barrens were in large areas of sandy glacial outwash, or in the sandy beds of extinct glacial lakes, but they also occurred on river terraces, old dune systems, gravely moraine, and sandspits. Geographically, areas of extensive barrens were concentrated in northeastern, north-central, northwestern and central Wisconsin (see map Historical Pine Barrens in Wisconsin). They were also common on the extensive outwash terraces along the Lower Wisconsin, Lower Chippewa and Mississippi Rivers.

In pine barrens, the most common tree is the jack pine, but red pine may also be present. Hill's oak and bur oak may be present as grubs or as a scattering of larger trees. The understory is composed of grasses, sedges, and forbs, many of them associated with dry prairies. Plants of the heath family, such as blueberries and bearberry, and shrubs such as prairie willow, hazelnut, and redroot, are often prominent members of the barrens flora. Pine barrens distribution is centered on areas of extensive sandy soils, mostly to the north and east of the climatic tension zone described by Curtis (1959).

Oak barrens are savannas which have black oak or Hill's oak as their most prominent tree. Jack pine is absent or in low abundance, and the understory consists of plants associated with dry sandy prairies. The oak barrens community occurs primarily south and west of the Tension Zone.

Bracken grasslands are open areas in the northcentral and northeastern regions of Wisconsin, most typically in depressions where frost limits the growth of trees. The vegetation is characterized by low shrubs such as blueberries and sweet fern, along with grasses and other herbs. The bracken grasslands are sometimes treated as barrens, but the prairie flora may be entirely absent, non-native, weedy species are often common, and the origin of these northern openings remains obscure.

The barrens are a tenuous group of communities pulled in opposing directions by disturbance and succession. Depending on the severity and frequency of disturbance, the barrens community can range in structural appearance from open lands with grasses, shrubs, and tree sprouts, to savannas with scattered trees, to closed canopy forests. The following sections describe issues related to the more open barrens, which are among the rarest of the potential successional stages.

Global/Regional Context

The pine barrens are rare and imperiled globally. In North America, they exist primarily in the midwest and along the east coast (see map Historical Location of Pine Barrens in North America). Wisconsin has one of the best opportunities in North America for preserving and restoring this community. Oak barrens are also rare and imperiled globally. Significant opportunities for oak barrens protection and restoration exist in Wisconsin but most of these are at a relatively small scale of several hundred acres or less.

Issues of Function, Structure and Composition

- Barrens community function, structure and composition depend on the type and frequency of disturbance, land use history, and the location, size, and connectivity of remaining sites.
- Most remaining barrens sites are too small and isolated to ensure long-term viability of all their characteristic native plants and animals.
- Most of the northern pine barrens have succeeded to closed canopy northern dry forest or have been converted to pine plantations.
- Most of the southern oak barrens have succeeded to southern dry forest or have been converted to agriculture.
- The predominant function problem is lack of fire or similar disturbance.

- The predominant structure problem is the dominance of trees, with less representation of grasses, forbs, and shrubs and associated fauna.
- The predominant composition problem is the paucity of grasses, forbs, and shrubs and associated fauna for these more open stages of the barrens community. Stand isolation can make species loss difficult to overcome because recolonization may be difficult or impossible.
- Because of species ranges and differences in ecosystem attributes and potentials, the full range of variability expressed in the barrens complex can only be preserved by securing sites throughout the range of the type.
- Rare barrens species include Karner blue butterfly *(Lycaeides melissa)*, northern blue butterfly *(Lycaeides idas)*, frosted elfin butterfly *(Incisalia irus)*, phlox moth *(Schinia indiana)*, Kirtland's warbler *(Dendroica kirtlandii)*, slender glass lizard *(Ophisaurus attenuatus),* eastern massasauga rattlesnake *(Sistrurus catenatus),* Blandings turtle *(Emydoidea blandingi),* sand violet *(Viola fimbriatula),* rough white lettuce *(Prenanthes aspera),* wooly milkweed *(Asclepias lanuginosa),* brittle prickly pear *(Opuntia fragilis),* ternate grape fern *(Botrychium rugulosum),* common hairgrass *(Deschampsia cespitosa),* and prairie fameflower *(Talinum rugospermum)*.
- Karner blue butterfly, Kirtland's warbler, and prairie fameflower are globally rare. Wisconsin likely has the best opportunities to protect the Karner blue and possibly the prairie fameflower.
- Of present species associated with barrens, the sharp-tailed grouse needs the greatest patch size, with an estimated 10,000 acres of suitable habitat needed to support a viable population.

Assessment of Current Condition

Pine barrens originally covered 2.3 million acres, or 7% of Wisconsin's pre-European settlement landscape. Oak barrens covered 1.8 million acres, or 5% of the pre-European settlement landscape. As of 1995, approximately 10,000 acres of good quality pine and oak barrens remained at 65 sites. Of this, oak barrens occur on just 1,432 acres on 20 sites. Total barrens acreage is estimated at around 50,000 acres, but much of this land is more severely degraded and/or has only just entered the restoration phase.

Most remaining pine and oak barrens exist as small, isolated fragments on approximately a dozen state-managed or federally-managed areas. These fragments may indicate that a larger area of the surrounding landscape has the potential to return to a barrens stage.

Bracken grasslands have significantly declined due to fire control, tree planting, and aspen sprouting following clear-cutting of adjacent forest. As a result they have often converted to forest except on sites such as frost pockets where growing season frosts have inhibited tree growth.

Land Use and Environmental Considerations

Lack of regular burning continues to be the most limiting factor in barrens restoration and maintenance.

Air quality standards and increasing residential developments in and near barrens communities further reduce the potential for using prescribed burns to maintain the community.

To most of the public, barrens do not seem to have the same aesthetic appeal as forests. However, groups and communities interested in blueberry picking, and in using barrens areas for hunting, bird-watching, hiking, skiing, horse riding and other open-area uses may be potential supporters of restoration.

Pine Barrens: Areas supporting pine barrens communities are often used for commercial forestry purposes including both harvesting of naturally regenerating pines and conversion to pine plantations. Such uses provide wood fiber for growing consumer demands, sequester atmospheric carbon, and reduce harvest pressure on natural conifer forests. Wildlife species that are valuable from a recreational perspective for this community in its open condition include sharp-tailed grouse and bears. Blueberry picking is also a cherished tradition on barrens.

Oak Barrens: In central and southern counties, most of the former oak barrens communities now support extensive pine plantations or irrigation-dependent agriculture, or have succeeded to dry oak forest. Some are also on large tracts of public lands such as Fort McCoy and Jackson County Forest, for example. Oak forests that could be restored to oak barrens are often owned by landowners who prefer the woodland condition, high grade

the older oak in timber harvests, or reject use of fire disturbance as a management tool. Wildlife with substantial recreational value associated with this community includes the white-tailed deer and wild turkey.

Statewide Ecological Opportunities

Oak and pine barrens are among the most resilient natural communities. They can be relatively easy to restore, responding to careful management by controlled burns and cutting. They are also not as suitable for farming or as desirable for housing development as other community types. Most opportunities exist in northwest, northeast, central, and southwest Wisconsin.

To restore and preserve the full species composition of barrens communities, sites must be managed across the historic range of this community, including both southern and northern components (see map Barrens Occurrences in Wisconsin showing locations of key rare species). Some may be small; but some must approach ten thousand acres or more. The best large-scale opportunities appear to include:

Northwest Wisconsin:

Fish Lake Wildlife Area
Crex Meadows Wildlife Area
Kohler-Peet Barrens
Namekagon Barrens Wildlife Area
Douglas County Wildlife Area
Moquah Barrens Wildlife Area
Large private land-holdings

Central Wisconsin:

Necedah National Wildlife Refuge
Meadow Valley Wildlife Area
Sandhill Wildlife Area
Wood County Wildlife Area
Fort McCoy
Black River State Forest
County forests of Juneau, Monroe, Jackson, and Adams counties

Southern Wisconsin:

Lower Wisconsin Riverway (see Occurrences map).

Small-scale barrens management efforts will be needed in additional areas to preserve rare species and distinctive variants of the community. Good opportunities occur in the west-central counties of Dunn and Eau Claire, especially along the Lower Chippewa and Eau Claire Rivers. Opportunities also occur in central Wisconsin and in Marinette, Florence, and Oconto Counties.

As with any significant landscape or ecosystem management project, it will be important to balance ecological concerns with economic concerns, community interests, and impacts on residents.

Opportunities by Ecological Landscape

The best opportunities for preservation, enhancement, and restoration of barrens communities can be found in the following Ecological Landscapes:

- *Northwest Sands* – Oak and Pine Barrens
- *Northeast Sands* – Pine Barrens and Bracken Grasslands
- *Northern Highland* – Bracken Grasslands
- *Central Sand Plains* – Oak and Pine Barrens

- *Central Sand Hills* – Oak and Pine Barrens
- *Western Coulees and Ridges* – Oak and Pine Barrens

Data Sources and Maps Useful for Site Selection

The following information can be reviewed to determine the best local sites for maintaining, enhancing, and restoring the barrens community:

- Soils map – sandy soils
- Pre-settlement vegetation – pine and oak barrens
- Human population density – low density to allow for prescribed burns
- Land ownership – large areas under control of a single owner with conservation as a priority
- Natural Heritage Inventory – current sites with barrens community and associated rare species http://www.dnr.state.wi.us/org/land/er/rare.htm
- WISCLAND land cover map - current land cover
- The Web site of the Sand County Foundation includes general information, extensive references and links to other web sites: http://www.sandcountyfoundation.com/savannaframe.html (exit DNR)

Recommended Readings and References

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Shively, MM and SA Temple. 1994. *An ecosystem recovery plan for Wisconsin pine-shrub-grassland ecosystems (pine barrens)*. University of Wisconsin - Madison, Madison, WI. 48 pages.

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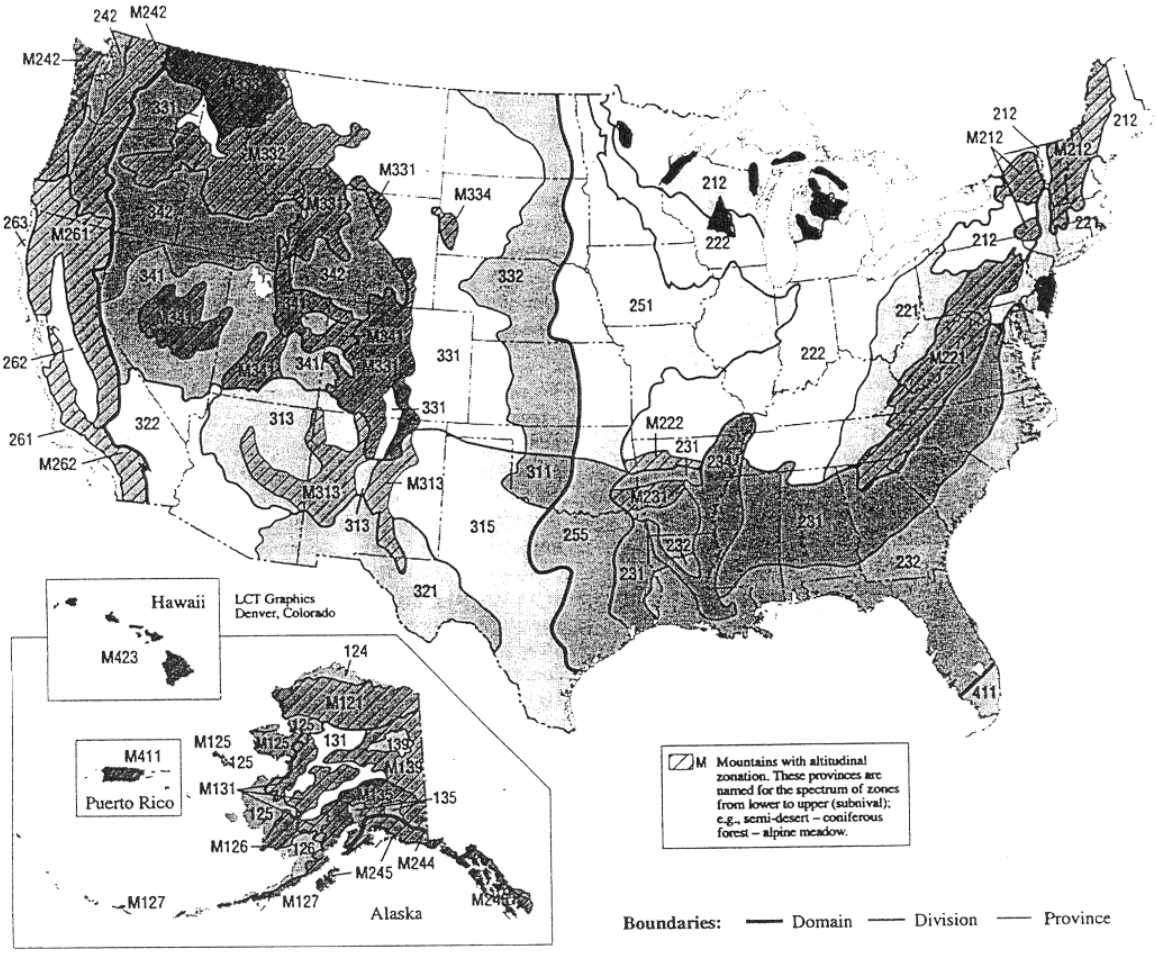
In the absence of fire, oak barrens can quickly become overgrown with shrubs, seedlings and trees. Otter Creek Oak Barrens, Dunn County

Depending on fire frequency, oak/pine barrens can have a greater or lesser density of trees.

Namekagon oak/pine barrens, Burnett County. Landscape view of the structure of this community type.

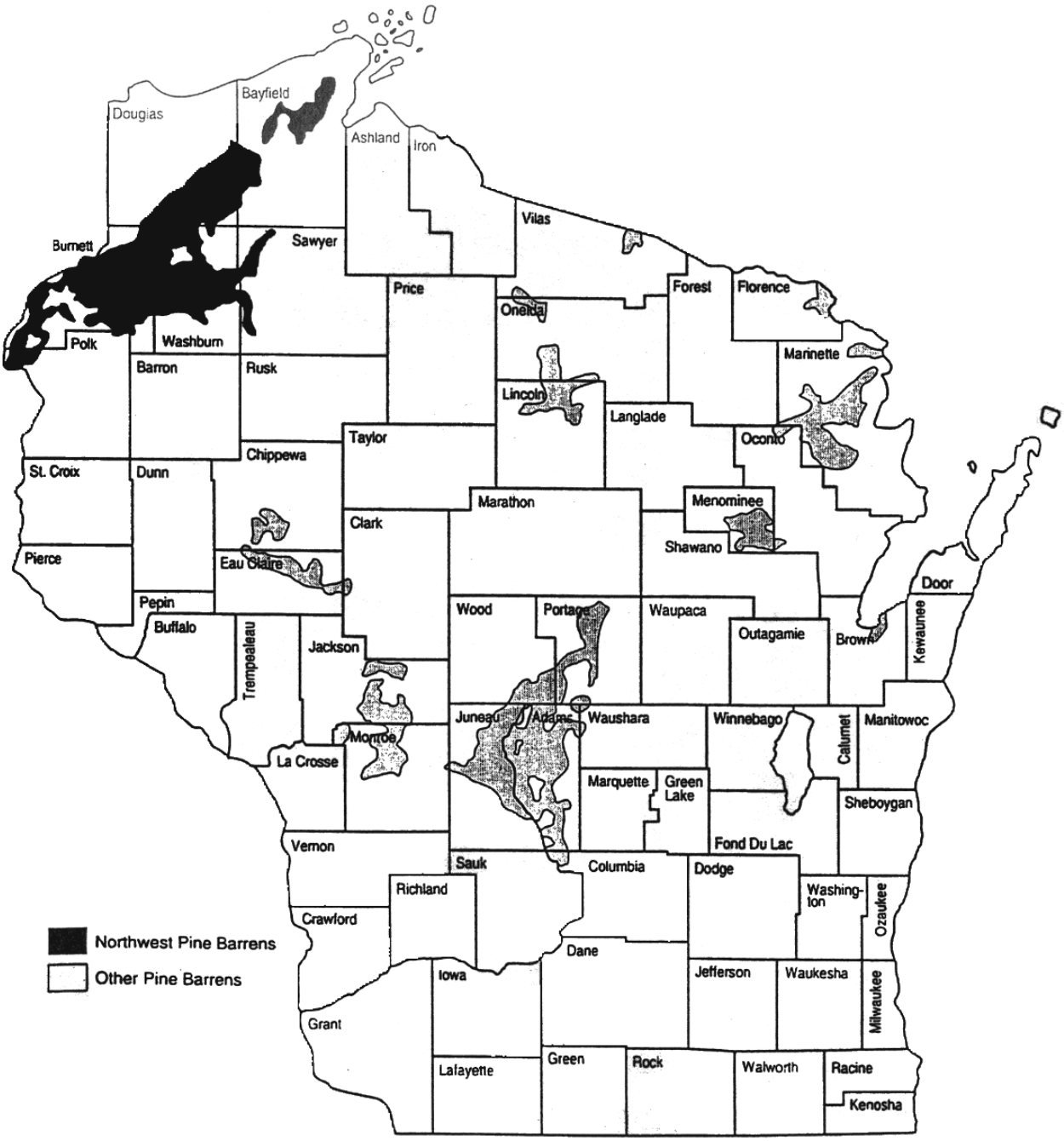
Pine Barrens are dominated by an overstory of scattered pine. Understory is composed of shrubs, herbs, grasses and sedges. Great Lakes Barrens, Apostle Islands, Ashland County

Historical Location of Pine Barrens in North America



Areas that were formerly pine barrens are shown in black.

HISTORICAL PINE BARRENS IN WISCONSIN



Barrens Occurrences in Wisconsin